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ABSTRACT

The need for treatment and prevention of cardiovascular heart disease (CHD) cannot be overestimated. There have been attempts to treat and prevent CHD by focussing on the relationship between a psychosocial factor, Type A Behavior Pattern (TABP), and CHD. Recent research suggests a consistent relationship between hostility, (a characteristic previously attributed to TABP), and CHD, but an inconsistent relationship between hostility and TABP. Researchers now propose that hostility is the critical psychosocial factor associated with CHD. Absence of a sense of humor has also been proposed as a characteristic of TABP, and nonhostile sense of humor would seem to be incompatible with hostility. This study assessed the relationships among sense of humor, hostility, and TABP using multiple regression. Junior college students (N=151) were given four questionnaires: Jenkins Activity Survey, Situational Humor Response Questionnaire, Novacco Anger Scale, and a demographic questionnaire. Results suggest that hostility significantly accounts for about four percent of behavior pattern variance while sense of humor does not account for any variance. The meaning of the results pertaining to sense of humor is unclear since actual effect size was smaller than originally estimated and subsequent level of power was low. Counselors should note that while hostility reduction is appropriate for CHD treatment and prevention, humor has not yet been established as a suitable replacement. (Author/LLL)

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THE RELATIONSHIP OF SENSE OF HUMOR AND HOSTILITY TO THE TYPE A BEHAVIOR PATTERN

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ABSTRACT

Early research revealed a relationship between Type A Behavior Pattern (TABP) and cardiovascular heart disease (CHD). Recent research suggests a consistent relationship between hostility (a characteristic previously attributed to TABP) and CHD, but a somewhat inconsistent relationship between hostility and TABP. Researchers now propose that hostility is the critical psychosocial factor associated with CHD.

Absence of a sense of humor has also been proposed as a characteristic of TABP, and a nonhostile sense of humor would seem to be incompatible with hostility. This study assessed the relationships among sense of humor, hostility, and TABP using multiple regression. 151 volunteer subjects from randomly selected classes at a junior college were given four questionnaires (Jenkins Activity Survey, Situational Humor Response Questionnaire, Novacco Anger Scale, and a demographic questionnaire). Results suggest that hostility significantly accounts for about 4% of behavior pattern variance while sense of humor does not account for any. The meaning of the results pertaining to sense of humor is unclear since actual effect size was smaller than originally estimated and subsequent level of power was low. Counselors should note that while hostility reduction is appropriate for CHD treatment and prevention, humor has not yet been established as a suitable replacement.

LITERATURE REVIEW

The need for treatment and prevention of cardiovascular heart disease (CHD) cannot be overestimated. According to the World Almanac and Book of Facts (1988), more than 64 million Americans have one or more types of heart and blood vessel disease, and 47.6% of all deaths in the U.S. in 1985 were caused by some form of heart disease.

There have been attempts to treat and prevent CHD by focussing on the relationship between a psychosocial factor, Type A Behavior Pattern, and CHD (Rosenman & Chesney, 1982). The Type A Behavior Pattern includes competitiveness, aggressiveness, impatience, and a sense of time urgency (Friedman & Rosenman, 1974). The converse behavior pattern, Type B, is characterized by an absence of these behaviors. While research results have revealed a consistent relationship between CHD and one component of Type A Behavior Pattern in particular, hostility (Barefoot, Dahlstrom, & Williams, 1983; Shekelle, Gale, Ostfeld, & Oglesby, 1983), they have suggested a somewhat inconsistent relationship between hostility and the Type A Behavior Pattern (Haynes, Feinleib, & Kannel, 1980; Haynes, Feinleib, Levine, Scotch, & Kannel, 1978). Consequently, some investigators have begun to focus exclusively on the modification of hostile responses (Levenkron, Cohen, Mueller, & Fisher, 1983).

Subjects have been taught strategies for avoiding becoming angry by avoiding anger-inducing situations and/or for moderating responses resulting from hostility such as negative thought patterns and muscle tension (Levenkron et al., 1983; Suinn, 1977). An alternative approach would involve identifying responses which are incompatible with hostile responses and could be used as replacements for them. One such possible response is humor.

Studies addressing the long-term effects of humor and its absence on health or of the physiological consequences of repeated or prolonged laughter are almost nonexistent (Goldstein, 1987). Still, evidence which exists so far is promising. Studies by Averill (1969) and Goldstein, Harman, McGhee, and Karasik (1975) suggest that laughter of brief duration can reduce the autonomic arousal characteristic of stress. Fry (1979) has noted that this characteristic of laughter suggests its potential for reducing stress related to heart disease. Furthermore, Mantell and Goldstein (1985) have proposed that individuals with the Type B Behavior Pattern may possess a sense of humor in place of the anger and hostility of those with the Type A Behavior Pattern.

However, empirical support for the relationship between sense of humor and Type A Behavior Pattern has been lacking.

The purpose of this study was to investigate whether measures of sense of humor and of hostility can be used to predict Type A Behavior Pattern. The question addressed in this study was: What is the relationship of sense of humor and anger to the Type A Behavior Pattern?

METHOD

The sample used in this study was drawn from summer school social science classes at a large junior college located in an urban area in the southwestern United States. Subjects were obtained by randomly selecting classes from which volunteers were recruited.

Based on procedures described by Cohen and Cohen (1983), it was determined that a minimum of 150 subjects would have to participate in the study to provide a .80 level of power since an alpha of .05 would be used, two independent variables would be assessed, and an effect size of $f^2 = .10$ was assumed. Data were collected from 159 subjects, but eight were deleted because of missing data on the criterion and/or predictor variables. Consequently, the actual sample size was 151 subjects. Of the 151 subjects, 114 were female and 37 were male. Ages ranged from 17 to 49 years old with a mean of 26.8 and a standard deviation of 8.3 years.

Subjects were given four brief questionnaires which they completed in a group format in their respective classrooms. The order of presentation was randomly varied to control for order effect. The questionnaires consisted of the Jenkins Activity Survey (JAS), the Situational Humor Response Questionnaire (SHRQ), the Novacco Anger Scale (NAS), and a demographic questionnaire which included questions concerning occupational status. In particular, subjects were asked to indicate their current occupations and, if they indicated that they were fulltime students, their previous occupations. Subjects were also asked to indicate their projected occupations. Their responses were grouped according to the ten major occupational categories in the Dictionary of Occupational Titles (1977) and are summarized in Table 1.

The JAS is composed of 54 items which provide four scores, one for the composite Type A scale and three for the subscales (speed and impatience, job involvement, and hard-driving) (Jenkins, Rosenman, & Friedman, 1967). For the purpose of this study, only the score from the Type A scale was used. Assessment of the Type A Behavior Pattern using the JAS is both reliable and valid (Glass, 1977; Jenkins, Zyzanski, & Rosenman, 1979; Zyzanski & Jenkins, 1970). Furthermore, scores on the JAS Type A scale have predicted the development of CHD (Jenkins, Rosenman, & Zyzanski, 1974), reinfarction (Jenkins, Zyzanski, &

TABLE 1

FREQUENCIES REPORTED BY RESPONDENTS OF OCCUPATIONS

	Current Occupation	Previous Occupation	Projected Occupation
Occupation	n	n	n
Professional, technical, managerial	20	12	125
Clerical, sales	28	10	7
Service	30	19	3
Agricultural, fishery, forestry	0	0	0
Processing	0	1	0
Machine trades	0	0	0
Benchwork	0	0	0
Structural work	2	1	0
Miscellaneous	1	1	1
Unknown/ unidentifiable	7	4	14
Fulltime student	63	15	1
Totals	151	63	151

Rosenman, 1976), and extent of atherosclerosis (Zyzanski, Jenkins, Ryan, Flessas, & Everist, 1976).

The SHRQ is composed of 21 items which provide a measure of the frequency with which people experience humor--a quantitative approach to sense of humor (Martin & Lefcourt, 1984). These authors point out that traditional humor research has assessed appreciation of certain types of humor and that this approach is

vulnerable to social desirability response bias. Furthermore, it provides little information about the actual role of humor in daily life. Their solution was to develop the SHRQ which directs the respondent's attention towards the humorousness of everyday situations in which laughter is relatively unusual. Studies of both reliability and validity have provided promising results (Martin & Lefcourt, 1984), but provide greater support for the validity of the SHRQ for males than for females. Martin and Lefcourt suggest that this may be due to a restriction in variability in the females' scores on several of the measures, noting that overall, the evidence supports the validity of the SHRQ for both sexes.

The NAS is composed of 90 items which provide a measure of specific anger reactions to provocation (Novacco, 1975). The author of this scale notes that ". . . the failure to cope effectively with provocation stress can be particularly tragic, as it can result in the alienation of loved ones, disrupted work performance, and even cardiovascular disorder" (p. xi). Notably, Katz and Toben (1986) used the NAS and found a significant relationship between anger proneness and both cardiac reactivity and the Type A Behavior Pattern.

While Novacco (1975) notes that previously developed methods of assessing hostility usually focus on what people do when angry rather than on what provokes anger, Friedman and Rosenman (1974) describe the hostility of individuals that they have worked with who displayed the Type A Behavior Pattern and report that they ". . . showed an easily aroused hostility, which was likely to flare up under very diverse conditions" (p. 75). Therefore, the 90 statements of provocation incidents which Novacco developed and which became the NAS are particularly appropriate for assessing hostility in individuals who engage in Type A behavior. While little information related to the reliability and validity of the NAS has been reported, the results of two studies provide evidence that the NAS yields reliable and valid measures (Katz & Toben, 1986; Novacco, 1975).

RESULTS

A simultaneous multiple regression was utilized to determine if measures of hostility and of sense of humor are significant predictors of Type A Behavior Pattern. A significant multiple correlation of .2074 [$F(2,148) = 3.32$, $p = .04$] was obtained. An overall R^2 of .0430 was obtained, indicating that the predictor variables account for about 4% of the variance in the criterion variable.

When the predictor variables were examined separately, only hostility was found to be statistically significant (beta = .2052). The squared semipartial correlation coefficients suggest that hostility accounts for about 4% (.0420) of the

total variance in behavior pattern beyond that accounted for by sense of humor while sense of humor does not significantly account for any. Means and standard deviations for both the predictor and the criterion variables are given in Table 2.

TABLE 2

MEAN SCORES AND STANDARD DEVIATIONS FOR SENSE OF HUMOR, HOSTILITY, AND THE TYPE A BEHAVIOR PATTERN

n = 151

Variables	Mean	Standard Deviation
SHRQ	50.10	9.18
NAS	310.47	50.94
JAS	230.16	66.75

Note. SHRQ = Situational Humor Response Questionnaire; NAS = Novacco Anger Scale; JAS = Jenkins Activity Survey.

Tests of assumptions of normality, linearity, homoscedasticity, multicollinearity, and singularity were conducted. The results suggest that the assumptions were supported. Examination of both a histogram and a normal probability plot of standardized residuals suggests that the assumption of normality was supported. The spread of the differences between observed and predicted values on measures of behavior pattern, hostility, and sense of humor is homogenous, indicating that the assumption of homoscedasticity was met. Furthermore, the scatterplot of these differences provides support for the assumption of linearity. Finally, an inspection of the tolerances and a simple correlation matrix calculated between the two predictors (see Table 3) indicates that the assumptions of multicollinearity and singularity were met.

In addition, the influence of outliers was addressed. An inspection of the standard residuals indicated that the ten worst outliers fell within three standard deviations of the mean, which according to Tabachnick and Fidell (1983) is an acceptable range.

TABLE 3

SIMPLE CORRELATIONS CALCULATED BETWEEN SENSE OF HUMOR, HOSTILITY, AND THE TYPE A BEHAVIOR PATTERN

n = 151

	SHRQ	NAS
NAS	-.037	
JAS	.031	.204*

Note. SHRQ = Situational Humor Response Questionnaire; NAS = Novacco Anger Scale; JAS = Jenkins Activity Survey. *p < .05.

A post hoc examination of potential suppressor variables was also conducted. Comparison of the signs of simple correlations between each predictor variable and the criterion variable with the signs of the beta values indicated that neither predictor variable was a suppressor variable. In addition, an analysis of the actual level of power was performed. Based on an actual effect size of .04 (using the Cohen & Cohen, 1983, procedure and the sample R^2 as an estimate of the population R^2 to calculate the effect size), an alpha level of .05, and a sample size of 151, the power analysis revealed a level of .60.

CONCLUSIONS

The purpose of this study was to investigate whether Type A Behavior Pattern can be predicted using measures of hostility and sense of humor. Since assumptions of normality, linearity, homoscedasticity, multicollinearity, and singularity were met and since outliers fell within an acceptable range, it appears that it was appropriate to apply multiple regression analysis to this data set.

The results suggest that, taken together, sense of humor and hostility are significant predictors of behavior pattern at the .05 level, accounting for approximately 4% of the variance in behavior pattern. When examined separately, however, hostility was found to be a significant predictor variable, but sense of humor was not. Hostility accounted for about 4% of the variance in behavior pattern while sense of humor did not

significantly account for any. In addition, although hostility is a statistically significant predictor of variance in behavior pattern, the actual amount (4%) is small and of limited practical importance. Approximately 96% of the variance in behavior pattern is still unaccounted for.

It should be noted that when Katz and Toben (1986) found a relationship between hostility and Type A Behavior Pattern, they only used subjects whose scores were in the top and bottom quintiles on the JAS. The fact that some of the variance in behavior pattern, albeit a small amount, was predicted in this study by amount of hostility of subjects with JAS scores ranging across the full spectrum is gratifying. On the other hand, a larger amount of variance in behavior pattern might have been predicted by hostility--and for that matter, by sense of humor as well--if the data used in this multiple regression had only included subjects with extreme scores on the JAS. However, only using extreme scores requires collecting data from a much larger number of people than the number of subjects one ultimately needs and discarding/wasting a huge amount of data. In addition, the generalizability of the results will be limited by this procedure. In a replication of this study, the possible benefits of looking only at the data of those with high or low scores on the JAS should be weighed against the high cost in terms of loss of data and limited generalizability.

Another concern involves the potential for confounding humor with hostility in the form of disparaging humor, humor at the expense of others. Martin and Lefcourt (1984) developed the Situational Humor Response Questionnaire (SHRQ) which is a valid and reliable measure of ". . . a generalized propensity toward humor regardless of the type . . ." (p. 145). The SHRQ, therefore, is a potential solution to the possibility of confounding disparaging types of humor with the hostility of the Type A Behavior Pattern. However, the authors included at least one item which, if the situation elicits humor, results in amusement at another's expense ("If you were eating in a restaurant with some friends and the waiter accidently spilled some soup on one of your friends . . .", p. 150). Although a simple correlation coefficient calculated between the NAS and the SHRQ was not significant, further assessment of such possible confounding is recommended.

Furthermore, although there is evidence for the validity of the SHRQ for both sexes, there is less evidence of the validity of the questionnaire for women than for men, and Martin and Lefcourt (1984) believe that this might be due to a restriction in variability in the women's scores. Since the majority of subjects in this study were female, the lack of evidence for a unique contribution from sense of humor in predicting behavior pattern may be due to a restriction in variability in the women's scores on the SHRQ rather than an actual lack of

variability in senses of humor. On the other hand, perhaps females with the Type A Behavior Pattern are different from males with the Type A Behavior Pattern on sense of humor. It would seem prudent to examine the relationship between sense of humor and behavior pattern separately for men and women at the very least and perhaps to even try to find a valid and reliable measure of sense of humor with a wider range of scores for women.

Another factor worth noting is that students who choose to attend school during the summer may differ in sense of humor from the general student population. Perhaps, for example, students who attend school in the summer are generally more serious. The mean SHRQ score in this study (50.10, standard deviation of 9.18) is approximately a standard deviation lower than the mean SHRQ score in the original study (59.6, standard deviation of 9.06) and suggests that the subjects in the original study of the SHRQ had greater propensity toward humor than the subjects in the present study.

Ultimately, however, the meaning of the lack of a statistically significant contribution by sense of humor is ambiguous because calculations of actual effect size and power revealed that the effect size was small (.04) and that the subsequent level of power (.60) was low since power should be at least .80 (Fagley, 1986). As Fagley (1986) has pointed out, "Nonsignificant results can be a potential contribution to knowledge [but] only when the power of the statistical tests was high and are ambiguous at best when the power of the statistical tests was low" (p. 391). Consequently, both the conclusion that sense of humor isn't a predictor of Type A Behavior Pattern and the conclusion that the power of the analysis was too low to detect such a relationship although it existed are viable.

Based on the actual effect size and level of power calculated following the multiple regression analysis, it is concluded that either a larger alpha or else a larger sample size was needed to increase power. Since the larger of the two conventional levels of alpha was used, it appears that an increase in sample size would have been the key to increased power. Although sample size was calculated prior to collecting the data in order to obtain a power level of .80, the estimate of effect size used in that calculation was larger than the actual effect size and resulted in a smaller sample size than was actually needed.

Finally, the restricted variability found in occupations in this study might be a factor in the results obtained (see Table 1). As Gordon and Verter (1969) and Shekelle, Schoenberger, and Stamler (1976) have noted, age does not appear to be related to Type A Behavior Pattern with the exception of a lower rate at younger ages before occupational challenges exist. On the other

hand, other characteristics such as level of education and occupational status are related to Type A Behavior Pattern (Rosenman & Chesney, 1980; Waldron, Zyzanski, Shekelle, Jenkins, & Tannebaum, 1977).

Thus, the results suggest that sense of humor and hostility are significant predictors of Type A Behavior Pattern when examined together. However, the present study suggests that the relationship between Type A Behavior Pattern and hostility may be statistically significant, but practically unimportant. Furthermore, when examined separately, sense of humor is not a significant predictor of behavior pattern in this study. An analysis of power revealed a low level of power. Therefore, the lack of significant contribution by sense of humor may be due either to the lack of a relationship between sense of humor and behavior pattern or else to the lack of power to detect the relationship. The issues raised above concerning the instruments and the number of subjects should be considered carefully when planning replications of this study. In addition, counselors should note that while hostility reduction is appropriate for CHD treatment and prevention, humor has not yet been established as a suitable replacement.

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